

CLAIMS

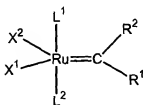
 There are no amendments to the claims.

 X A complete listing of all claims ever present in this case in ascending order with status identifier is presented in a separate section.

COMPLETE LISTING OF CLAIMS
IN ASCENDING ORDER WITH STATUS INDICATOR

Claims 1-14 cancelled.

Claim 15 (new): A compound of the formula I,

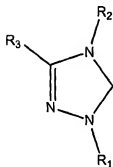


I

where X¹ and X² are identical or different and are each an anionic ligand,

R¹ and R² are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups are identical or different and are selected independently from among straight-chain, branched, cyclic or noncyclic radicals from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms, aryl radicals having up to 30 carbon atoms and silyl radicals, or R¹ and R² contain a ring,

where one or more of the hydrogen atoms in the hydrocarbon or silyl groups or both the hydrocarbon and silyl group can be replaced independently by identical or different alkyl, aryl, alkenyl, alkynyl, metallocenyl, halogen, nitro, nitroso, hydroxy, alkoxy, aryloxy, amino, amido, carboxyl, carbonyl, thio or sulfonyl groups, the ligand L¹ is an N-heterocyclic carbene of the formula IV and the ligand L² is an uncharged electron donor,



(IV)

where R₁, R₂ and R₃ are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups comprise identical or different, cyclic, noncyclic, straight-chain or/and branched radicals selected from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms and aryl radicals having up to 30 carbon atoms, in which at least one hydrogen may be replaced by functional groups, and where R₃ may be halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl groups.

Claim 16. (new): The compound as claimed in claim 15, wherein at least one R¹ and R² is C₁-alkyl.

Claim 17. (new): The compound as claimed in claim 15, wherein some or all of the hydrogen atoms in the hydrocarbon groups R₁, R₂, and R₃ in the formulae IV replaced independently by identical or different halogen, nitro, hydroxy, amido, carboxyl, carbonyl, thio or sulfonyl.

Claim 18. (new): The compound as claimed in claim 15, wherein R¹ and R² is C₁-alkyl.

Claim 19. (new): The compound as claimed in claim 15, wherein R¹ is hydrogen and R² is phenyl.

Claim 20. (new): The compound as claimed in claim 15, wherein L^2 is tricyclohexylphosphine.

Claim 21. (new): The compound as claimed in claim 15, wherein X^1 and X^2 independently are halide, alkoxide or carboxylate ions.

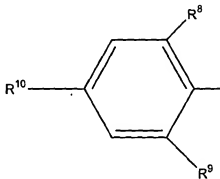
Claim 22 (new): The compound as claimed in claim 15, wherein X^1 and X^2 independently are halide.

Claim 23. (new): The compound of claim 15, wherein R^1 and R^2 together form a cycloalkyl or an aryl moiety.

Claim 24. (new): The compound of claim 15, wherein R^1 and R^2 are hydrogen or phenyl.

Claim 25 (new): The compound of claim 15, wherein R^1 and R^2 are phenyl.

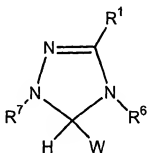
Claim 26. (new): The compound of claim 15, wherein R^1 and R^2 are the same and each is independently of the formula



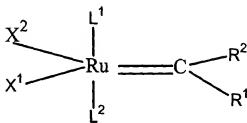
wherein:

R^8 , R^9 , and R^{10} are the same and are each methyl.

Claim 27. (new): A method for synthesizing the compound as claimed in claim 15, comprising contacting a compound of the formula



with a compound of the formula



wherein:

X¹ and X² are either the same or different and are an anionic ligand;

R¹ and R² are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups are identical or different and are selected independently from among straight-chain, branched, cyclic or noncyclic radicals from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl

radicals having up to 50 carbon atoms, aryl radicals having up to 30 carbon atoms and silyl radicals, or R¹ and R² contain a ring,

L¹ and L² are either the same or different and are neutral electron donor;

R⁶ and R⁷ are each independently hydrogen or a moiety selected from the group consisting of alkyl, alkenyl, alkynyl, aryl, carboxylate, alkoxy, alkenyloxy, alkynyloxy, aryloxy, alkoxycarbonyl, alkylthio, alkylsulfonyl and alkylsulfinyl, wherein R⁶ and R⁷ are each independently substituted or unsubstituted; and

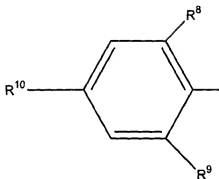
W is selected from the group consisting of C₁ -C₃ primary alkyl oxides and wherein W is substituted or unsubstituted.

Claim 28. (new): The method of claim 27, wherein the N-heterocyclic carbene ligand is triazolylidene.

Claim 29. (new): The method of claim 27, wherein R⁶ and R⁷ together form a cycloalkyl or an aryl moiety.

Claim 30. (new): The method of claim 27, wherein R⁶ and R⁷ are both hydrogen or phenyl.

Claim 31. (new): The method of claim 27, wherein R⁶ and R⁷ are the same and each is independently of the formula



wherein:

R^8 , R^9 , and R^{10} are each independently hydrogen, alkyl, alkoxy, aryl, or a functional group selected from hydroxyl, thiol, thioether, ketone, aldehyde, ester, ether, amine, imine, amide, nitro, carboxylic acid, disulfide, carbonate, isocyanate, carbodiimide, carboalkoxy, carbamate, and halogen.

Claim 32. (new): The method of claim 31, wherein R^8 , R^9 , and R^{10} are the same and are each methyl.

Claim 33. (new) The method of claim 27, wherein W is functionalized with a functional group selected from the group consisting of hydroxyl, thiol, thioether, ketone, aldehyde, ester, ether, amine, imine, amide, nitro, carboxylic acid, disulfide, carbonate, isocyanate, carbodimide, carboalkoxy, carbamate, and halogen.

Claim 34. (new): The method of claim 27, wherein W is methoxide.

Claim 35. (new): The method of claim 27, wherein X^1 and X^2 are each independently selected from the group consisting of hydrogen, halogen, substituted moiety and unsubstituted

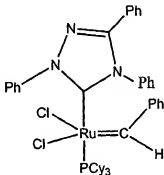
moiety, wherein the moiety is selected from the group consisting of alkyl, aryl, alkoxide, aryloxide, alkyldiketonate, aryldiketonate, carboxylate, arylsulfonate, alkylsulfonate, alkylthio, alkylsulfonyl, and alkylsulfinyl, and wherein the moiety substitution is selected from the group consisting of alkyl, alkoxy, and aryl; and

L^1 and L^2 are each independently selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, arsine, stibine, ether, amine, amide, imine, sulfoxide, carboxyl, nitrosyl, pyridine, and thioether; and R^1 is hydrogen and R^2 is phenyl.

Claim 36. (new): The method of claim 35, wherein X^1 and X^2 are each chloride and L^1 and L^2 are each independently selected from the group consisting of $P(\text{cyclohexyl})_3$, $P(\text{cyclopentyl})_3$, $P(\text{isopropyl})_3$, and $P(\text{phenyl})_3$.

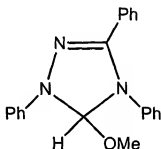
Claim 37. (new): The method of claim 27, wherein R^1 is hydrogen, R^2 , R^6 and R^7 are each phenyl, L^1 is PPh_3 , and X^1 and X^2 are each chloride.

Claim 38. (new): A method for synthesizing a compound of the formula

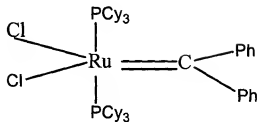


comprising:

contacting a compound of the formula:

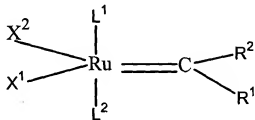


with a compound of the formula



Claim 39. (new): A method for attaching a N-heterocyclic carbene ligand to a ruthenium metal carbene metathesis complex comprising:

contacting the N-heterocyclic carbene ligand with a compound of the formula

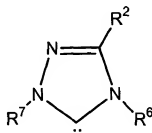


wherein

X^1 and X^2 are either the same or different and are an anionic ligand;

R^1 and R^2 are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups are identical or different and are selected independently from among straight-chain, branched, cyclic or noncyclic radicals from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms, aryl radicals having up to 30 carbon atoms and silyl radicals, or R^1 and R^2 contain a ring,

L^1 and L^2 are either the same or difference and are neutral electron donor;
the N-heterocyclic carbene ligand is a triazolylidene ligand of the formula:



R^6 and R^7 are each independently hydrogen or a moiety selected from the group consisting of alkyl, alkenyl, alkynyl, aryl, carboxylate, alkoxy, alkenyloxy, alkynyloxy, aryloxy, alkoxycarbonyl, alkylthio, alkylsulfonyl and alkylsulfinyl, wherein

R^6 and R^7 are each independently substituted or unsubstituted.

Claim 40. (new): The method of claim 39, wherein X^1 and X^2 are each independently selected from the group consisting of hydrogen, halogen, substituted moiety and unsubstituted

moiety, wherein the moiety is selected from the group consisting of alkyl, aryl, alkoxide, aryloxy, alkyldiketonate, aryldiketonate, carboxylate, arylsulfonate, alkylsulfonate, alkylthio, alkylsulfonyl, and alkylsulfinyl, and wherein the moiety substitution is selected from the group consisting of alkyl, alkoxy, and aryl; and

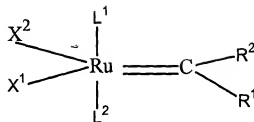
L^1 and L^2 are each independently selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, arsine, stibine, ether, amine, amide, imine, sulfoxide, carboxyl, nitrosyl, pyridine, and thioether; and R^1 is hydrogen and R^2 is phenyl.

Claim 41. (new): The method of claim 40, wherein X^1 and X^2 are each chloride and L^1 and L^2 are each independently selected from the group consisting of $P(\text{cyclohexyl})_3$, $P(\text{cyclopentyl})_3$, $P(\text{isopropyl})_3$, and $P(\text{phenyl})_3$.

Claim 42. (new): The method of claim 39, wherein the N-heterocyclic carbene ligand is unsaturated.

Claim 43. (new): A compound formed by attaching a N-heterocyclic carbene ligand to a ruthenium metal carbene metathesis complex comprising:

contacting the N-heterocyclic carbene ligand with a compound of the formula



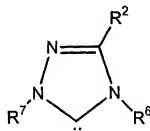
wherein

X^1 and X^2 are either the same or different and are an anionic ligand;

R^1 and R^2 are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups are identical or different and are selected independently from among straight-chain, branched, cyclic or noncyclic radicals from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms, aryl radicals having up to 30 carbon atoms and silyl radicals, or R^1 and R^2 contain a ring,

L^1 and L^2 are either the same or difference and are neutral electron donor;

the N-heterocyclic carbene ligand is a triazolylidene ligand of the formula:



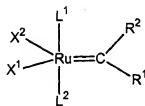
R⁶ and R⁷ are each independently hydrogen or a moiety selected from the group consisting of alkyl, alkenyl, alkynyl, aryl, carboxylate, alkoxy, alkenyloxy, alkynyloxy, aryloxy, alkoxycarbonyl, alkylthio, alkylsulfonyl and alkylsulfinyl, wherein R⁶ and R⁷ are each independently substituted or unsubstituted.

Claim 44. (new) The method of claim 43, wherein X¹ and X² are each independently selected from the group consisting of hydrogen, halogen, substituted moiety and unsubstituted moiety, wherein the moiety is selected from the group consisting of alkyl, aryl, alkoxide, aryloxide, alkyldiketonate, aryldiketonate, carboxylate, arylsulfonate, alkylsulfonate, alkylthio, alkylsulfonyl, and alkylsulfinyl, and wherein the moiety substitution is selected from the group consisting of alkyl, alkoxy, and aryl; and

L¹ and L² are each independently selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, arsine, stibine, ether, amine, amide, imine, sulfoxide, carboxyl, nitrosyl, pyridine, and thioether; and R¹ is hydrogen and R² is phenyl.

Claim 45. (new): The method of claim 44, wherein X¹ and X² are each chloride and L¹ and L² are each independently selected from the group consisting of P(cyclohexyl)₃, P(cyclopentyl)₃, P(isopropyl)₃, and P(phenyl)₃.

Claim 46. (new): A complex of ruthenium of the structural formula I,

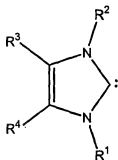


I

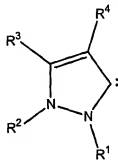
where X^1 and X^2 are identical or different and are each an anionic ligand,

R^1 and R^2 are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups are identical or different and are selected independently from among straight-chain, branched, cyclic or noncyclic radicals from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms, aryl radicals having up to 30 carbon atoms and silyl radicals, or R^1 and R^2 contain a ring,

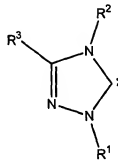
where one or more of the hydrogen atoms in the hydrocarbon or silyl groups or both the hydrocarbon and silyl group can be replaced independently by identical or different alkyl, aryl, alkenyl, alkynyl, metallocenyl, halogen, nitro, nitroso, hydroxy, alkoxy, aryloxy, amino, amido, carboxyl, carbonyl, thio or sulfonyl groups, the ligand L^1 is an N-heterocyclic carbene of the formulae II-V and the ligand L^2 is an uncharged electron donor,



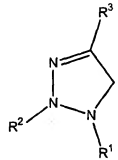
II



III



IV



V

where R^1 , R^2 , R^3 and R^4 in the formulae II, III, IV and V are identical or different and are each hydrogen or a hydrocarbon group,

where the hydrocarbon groups comprise identical or different, cyclic, noncyclic, straight-chain or/and branched radicals selected from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms and aryl radicals having up to 30 carbon atoms, in which at least one hydrogen may be replaced by functional groups, and where one or both of R^3 and R^4 may be identical or different halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl groups.